

Claims

What is claimed is:

- [c1] An automatic caching method for a distributed application having a client and a server, comprising:
 intercepting a call between the client and the server in order to collect information about
 objects accessed on the server during the call;
 prefetching data from an object on the server based on collected information;
 placing data into a client cache;
 synchronizing marked calls with the server; and
 synchronizing the client cache with the server.
- [c2] The automatic caching method of claim 1, further comprising:
 invalidating the client cache at the end of an activity.
- [c3] The automatic casting method of claim 1, further comprising:
 storing data in a proxy for the object that is locally accessible to the client.
- [c4] The automatic caching method of claim 3, wherein storing data in the proxy comprises
 creating the proxy from a proxy class.
- [c5] The automatic caching method of claim 4, wherein creating the proxy comprises storing a
 reference to the proxy in the client cache.
- [c6] The automatic caching method of claim 4, wherein creating the proxy comprises storing a
 reference to the object inside the proxy.
- [c7] The automatic caching method of claim 5, further comprising:
 invalidating the proxy at the end of an activity.
- [c8] The automatic caching method of claim 5, further comprising:
 partially invalidating the client cache at the end of an activity.

- [c9] The automatic caching method of claim 1, further comprising:
invoking a method of the object in response to a request received by a proxy to invoke the method of the object.
- [c10] The automatic caching method of claim 9, wherein invoking the method of the object comprises synchronizing data stored in the proxy with data in the object.
- [c11] The automatic caching method of claim 1, wherein collected information comprises object attributes requested by the client during the call.
- [c12] The automatic caching method of claim 1, wherein collected information comprises information for accessing an interface of the object.
- [c13] An automatic caching method for a distributed application having a client and a server, comprising:
intercepting a call between the client and the server in order to collect information about objects accessed on the server during the call;
prefetching data from an object on the server based on collected information;
placing data into a client cache;
synchronizing marked calls with the server;
synchronizing the client cache with the server;
invalidating the client cache at the end of an activity;
storing data in a proxy for the object that is locally accessible to the client; and
invoking a method of the object in response to a request received by the proxy to invoke the method of the object.
- [c14] An automatic caching method for an existing distributed application having a client and a server, comprising:
interposing a runtime between the client and the server which intercepts a call between the client and the server, the runtime having a capability to create a proxy for an object on the server;
collecting information about the object accessed by the client during an activity;
prefetching data from the object based on collected information; and

storing data in the proxy for the object that is locally accessible to the client.

- [c15] The automatic caching method of claim 14, wherein collected information comprises object attributes accessed by the client during an activity.
- [c16] The automatic caching method of claim 14, wherein interposing the runtime between the client and the server comprises instrumenting the client such that a request normally sent to the server is directed to the runtime.
- [c17] The automatic caching method of claim 14, wherein the runtime has a client portion that runs in the same machine as the client and a server portion that runs in the same machine as the server.
- [c18] The automatic caching method of claim 17, further comprising:
sending a request to the server portion by the client portion to synchronize data stored in the proxy with data in the object.
- [c19] The automatic caching method of claim 17, further comprising:
sending a request to the server portion to invoke a method of the object on behalf of the proxy.
- [c20] The automatic caching method of claim 19, further comprising:
synchronizing data stored in the proxy with the data in the object by the server portion prior to invoking the method of the object.
- [c21] An automatic caching system for a distributed application having a client and a server, comprising:
a client runtime interposed between the client and the server, the client runtime having a capability to intercept a call between the client and the server in order to insert a service for collecting information about objects accessed on the server during the call;
means for prefetching data from the objects on the server based on collected information;
and

means for storing data fetched from the objects on the server in a memory locally accessible to the client.

- [c22] The automatic caching system of claim 21, wherein the client runtime comprises a plurality of proxies for caching the data fetched from the server.
- [c23] The automatic caching system of claim 22, wherein each of the proxies is associated with an object on the server.
- [c24] The automatic caching system of claim 23, further comprising:
a server runtime interposed between the client runtime and the server which synchronizes data cached in the proxies with data in the objects.
- [c25] A computer-readable medium having recorded thereon instructions executable by a processor, the instructions for:
intercepting a call between a client and a server;
collecting information about an object accessed on the server during an activity;
prefetching data from the object based on collected information; and
storing data in a proxy for the object that is locally accessible to the client.
- [c26] The computer-readable medium of claim 25, further comprising:
instructions for creating the proxy from a proxy class.
- [c27] The computer-readable medium of claim 26, further comprising;
instructions for obtaining a reference to the object and storing the reference in the proxy.
- [c28] The computer-readable medium of claim 25, further comprising:
instructions for sending a request to the server to invoke a method of the object.
- [c29] The computer-readable medium of claim 25, further comprising:
instructions for interposing the proxy for the object such that the client accesses the proxy instead of the object.
- [c30] The computer-readable medium of claim 25, further comprising:

instructions for synchronizing data stored in the proxy with data in the object.

[c31] A computer-readable medium having recorded thereon instructions executable by a processor, the instructions for:

intercepting a call between a client and a server;
 collecting information about an object accessed on the server during an activity;
 prefetching data from the object based on collected information;
 storing data in a proxy for the object that is locally accessible to the client;
 creating the proxy from a proxy class;
 obtaining a reference to the object and storing the reference in the proxy;
 sending a request to the server to invoke a method of the object;
 interposing the proxy for the object such that the client accesses the proxy instead of the object; and
 synchronizing data stored in the proxy with data in the object.

[c32] An apparatus for a distributed application having a client and a server, comprising:
 means for intercepting a call between the client and the server in order to collect information about objects accessed on the server during the call;
 means for prefetching data from an object on the server based on collected information;
 means for placing data into a client cache;
 means for synchronizing marked calls with the server; and
 means for synchronizing the client cache with the server.